Appl. No. 10/630,595
Preliminary Amdt. dated August 18, 2008

PATENT

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application. Added text is indicated by underlining, deleted text is indicated by strikethrough. Changes are identified by a change bar at the left edge of text.

Listing of Claims:

1   1.   (previously presented) A system for enabling queries to a database to be

2   processed comprising:

3   a database system;

4   an application system for providing SQL database queries to the database system,

5   the database system coupled to the application system via a first connection over a network;

6   a storage system having a shared volume to store results from SQL database

7   queries made to the database system;

8   a first data path to provide a data connection between the storage system and the

9   application system, wherein the application system can directly access query results on the

10   storage system without communicating via the first connection;

11   a second data path to provide a data connection between the storage system and

12   the database system, wherein the database system directly stores query results to the storage

13   system via the second data path without communicating via the first connection; and

14   a return path selector coupled to the database system for selecting a return path

15   over which to return the results from queries made to the database system, the return path

16   selector selecting from among at least the first connection over the network or the first data path

17   between the storage system and the application system, wherein the return path selector

18   determines a data path based upon one or more attributes of the query results;

19   wherein, when the return path is chosen to be the storage system, the results are

20   sent to the storage system as a file and an address in the storage system for the file is provided to

21   the application system using the first connection; and

Appl. No. 10/630,595
Preliminary Amdt. dated August 18, 2008

PATENT

22   wherein the file has associated therewith a key and the key is used to control

23   access to the results, and also has associated therewith a flag to indicate status of the file, and

24   wherein the flag indicates at least one of whether the file is being written, is ready to be read, is

25   being read, and is available to be deleted.

1   2.   (previously presented) A system as in claim 1 further comprising a

2   request path selector coupled to the application system for selecting a request path over which to

3   send query data comprising the SQL database queries made to the database system, the request

4   path selector selecting from among at least the first connection or the storage system, wherein the

5   key and flag are stored in the storage system.

1   3.   (original) A system as in claim 1 wherein the storage system is coupled to

2   each of the application system and the database system using a switch.

1   4.   (original) A system as in claim 3 wherein a database hub system is used

2   to couple the application system and the database system.

1   5.   (previously presented) A system as in claim 1 wherein the results from

2   the query have a size, and the return path selector chooses a return path based on the size of the

3   results, and wherein said return selector compares the size of the results to a threshold to choose

4   said result path, and said threshold is set based on a current workload of the LAN.

1   6.   (previously presented) A system as in claim 5 wherein the return path

2   selector chooses a return path based on a prediction of the size of the results, and wherein said

3   prediction is based on similar queries from a query execution history.

1   7.   (original) A system as in claim 1 wherein the return path selector chooses

2   a return path based on a measurement of throughput of the first connection.

1   8.   (canceled)

Appl. No. 10/630,595
Preliminary Amdt. dated August 18, 2008

PATENT

1   9.   (original) A system as in claim 1 wherein after the results are used by the

2   application system, the application system designates the results as used, thereby enabling them

3   to be erased from the storage system at a later time.

1   10.   (original) A system as in claim 1 wherein after the query data is used by

2   the database system, the database system reuses the query data for a further query.

1   11.   (canceled)

1   12.   (canceled)

1   13.   (canceled)

1   14.   (previously presented) A system as in claim 10 wherein after the query

2   data is used by the database system, the database system designates the query data as used,

3   thereby enabling them to be erased from the storage system at a later time.

        15.   (canceled)

1   16.   (previously presented) A system as in claim 1 further comprising a hub

2   system coupled to each of the application system and the database system.

1   17.   (previously presented) A system for enabling queries to a database to be

2   processed comprising:

3   a database system;

4   an application system for providing SQL database queries to the database system

5   coupled to the application system via a first connection over a network;

6   a storage system having a volume to store results from SQL database queries

7   made to the database system;

8   a first data path to provide a data connection between the storage system and the

9   application system, wherein the application system can directly access query results on the

10   storage system without communicating via the first connection;

11   a second data path to provide a data connection between the storage system and

12   the database system, wherein the database system directly stores query results to the storage

13   system via the second data path without communicating via the first connection; and

14   a request path selector coupled to the application system for selecting a request

15   path over which to send query data comprising the SQL database queries made to the database

16   system, the request path selector selecting from among at least the first connection over the

17   network or the first data path between the storage system and the application system, wherein the

18   request path selector determines a data path based upon one or more attributes of the query data;

19   wherein, when the request path is chosen to be the storage system, the query data

20   are sent to the storage system as a file and an address in the storage system for the file is

21   provided to the database system using the first connection; and

22   wherein the file has associated therewith a key and the key is used to control

23   access to the results, and also has associated therewith a flag to indicate status of the file, and the

24   flag indicates at least one of whether the file is being written, is ready to be read, is being read,

25   and is available to be deleted.

1   18.   (original) A system as in claim 17 wherein the storage system is coupled

2   to each of the application system and the database system using a switch.

1   19.   (original) A system as in claim 18 wherein a database hub system is used

2   to couple the application system and the database system.

1   20.   (previously presented) A system as in claim 17 wherein the query data

2   have a size, and the request path selector chooses a request path based on the size of the query

3   data, and wherein if there is not enough space in said storage system, garbage collection is

4   performed before storing said query data to said storage system.

Appl. No. 10/630,595
Preliminary Amdt. dated August 18, 2008

PATENT

1   21.   (canceled)

1   22.   (canceled)

1   23.   (canceled)

1   24.   (canceled)

1   25.   (original) A system as in claim 17 further comprising a return path

2   selector coupled to the database system for selecting a return path over which to return results

3   from queries made to the database system, the return path selector selecting from among at least

4   the first connection or the storage system.

1   26.   (previously presented) A system as in claim 25 wherein the results from

2   the query have a size, and the return path selector chooses a return path based on the size of the

3   results, and wherein if there is not enough space in said storage system, garbage collection is

4   performed before storing said query data to said storage system.

1   27.   (previously presented) A system as in claim 17 wherein when the return

2   path is chosen to be the storage system, the results are sent to the storage system as a file and an

3   address in the storage system for the file is provided to the application system using the first

4   connection.

1   28.   (previously presented) A system for enabling queries to a database to be

2   processed comprising:

3   a database system;

4   an application system for providing SQL database queries to the database system

5   coupled to the application system via a first connection over a network, the application system

6   including a database access system, and the database system including a gateway system;

7   a storage system having a shared volume to store results from SQL database

8   queries made to the database system;

9   a first data path to provide a data connection between the storage system and the

10   application system, wherein the application system can directly access query results on the

11   storage system without communicating via the first connection;

12   a second data path to provide a data connection between the storage system and

13   the database system, wherein the database system directly stores query results to the storage

14   system via the second data path without communicating via the first connection; and

15   the gateway system including a return path selector for selecting a return path

16   over which to return the results from queries made to the database system, the return path

17   selector selecting from among at least the first connection over the network or the first data path

18   between the storage system and the application system, wherein the return path selector

19   determines a data path based upon one or more attributes of the query results;

20   wherein, when the request path is chosen to be the storage system, the query data

21   are sent to the storage system as a file and an address in the storage system for the file is

22   provided to the database system using the first connection; and

23   wherein the file has associated therewith a key and the key is used to control

24   access to the results, and also has associated therewith a flag to indicate status of the file, and the

25   flag indicates at least one of whether the file is being written, is ready to be read, is being read,

26   and is available to be deleted.

1   29.   (previously presented) A system as in claim 28 wherein the gateway

2   system includes a request path selector for selecting a request path over which to send query data

3   comprising the SQL database queries made to the database system, the request path selector

4   selecting from among at least the first connection or the storage system.

1   30.   (previously presented) A system for enabling queries to a database to be

2   processed comprising:

3   a database system;

4   an application system for providing SQL database queries to the database system

5   coupled to the application system via a first connection over a network, the application system

6   including a database access system, and the database system including a gateway system;

7   a storage system having a volume to store results from SQL database queries

8   made to the database system;

9   a first data path to provide a data connection between the storage system and the

10   application system, wherein the application system can directly access query results on the

11   storage system without communicating via the first connection;

12   a second data path to provide a data connection between the storage system and

13   the database system, wherein the database system directly stores query results to the storage

14   system via the second data path without communicating via the first connection; and

15   the database access system including a request path selector for selecting a request

16   path over which to send data comprising the SQL database queries made to the database system,

17   the request path selector selecting from among at least the first connection over the network or

18   the first data path between the application system and the storage system;

19   wherein, when the request path is chosen to be the storage system, the query data

20   are sent to the storage system as a file and an address in the storage system for the file is

21   provided to the database system using the first connection; and

22   wherein the file has associated therewith a key and the key is used to control

23   access to the results, and also has associated therewith a flag to indicate status of the file, and the

24   flag indicates at least one of whether the file is being written, is ready to be read, is being read,

25   and is available to be deleted.

1   31.   (currently amended) A system for enabling queries to a database to be

2   processed comprising:

3   a database system;

4   an application system for providing SQL database queries to the database system,

5   the database system coupled to the application system via a communications network

6   connection;

Appl. No. 10/630,595
Preliminary Amdt. dated August 18, 2008

PATENT

7   a switch coupled to each of the database system and the application system;

8   a storage system coupled to the switch, the storage system having a volume to

9   store results from SQL database queries made to the database system;

10   a first data path to provide a data connection between the storage system and the

11   application system, wherein the application system can directly access query results on the

12   storage system without communicating via the first connection;

13   a second data path to provide a data connection between the storage system and

14   the database system, wherein the database system directly stores query results to the storage

15   system via the second data path without communicating via the first connection; and

16   a return path selector coupled to the database system for selecting a return path

17   over which to return the results from queries made to the database system, the return path

18   selector selecting from among at least the ~~first connection over the network~~ communications

19   network connection or the first data path between the storage system and the application system,

20   wherein the return path selector ~~determines a data path~~ selects a return path based upon one or

21   more attributes of the query results;

22   wherein when the return path is selected to be the storage system, the results are

23   sent to the storage system as a file and an address in the storage system for the file is provided to

24   the database system using the communications network connection;

25   wherein the database system is configured to generate a key associated with the

26   file for the results to identify their location, send the key over the network to the ~~query~~

27   ~~provider~~application, and encrypt at least one of the key and the results;

28   wherein the key is used to control access to the results, and also has associated

29   therewith a flag to indicate status of the file, and wherein the flag indicates at least one of

30   whether the file is being written, is ready to be read, is being read, and is available to be deleted.

1   32.   (previously presented) A system as in claim 31 further comprising a

2   request path selector coupled to the application system for selecting a request path over which to

3   send query data comprising the SQL database queries made to the database system, the request

4   path selector selecting from among at least the communications network connection or the

Appl. No. 10/630,595
Preliminary Amdt. dated August 18, 2008

PATENT

5   switch, and wherein said return selector compares the size of the results to a threshold to choose

6   said result path, and said threshold is set based on a current workload of the LAN.

1   33.   (currently amended) A method of returning results to a query provider, In

2   the method for use in a system having a query provider which provides SQL database queries to

3   a database system connected to the query provider by a first connection over a network, the

4   query provider and the database system being each coupled to a storage system via different

5   paths, a method of returning results to the query provider, a the method comprising:

6   selecting a second connection, comprising a path from the query provider to the

7   storage system, for storing results from SQL database queries made to the database system in the

8   storage system as a file at an address which can be accessed separately by the query provider via

9   a the second connection independent of the network and by the database system via a third

10   connection independent of the network, comprising a path from the database system to the

11   storage system; and

12   sending the address of the results in the storage system via the first connection

13   over the network to the query provider;

14   generating a key for the results to identify their location, wherein the key is used

15   to control access to the results, and also has associated therewith a flag to indicate status of the

16   file, and wherein the flag indicates at least one of whether the file is being written, is ready to be

17   read, is being read, and is available to be deleted; and

18   sending the key over the network to the query provider.

1   34.   (canceled).

1   35.   (currently amended) A method as in claim 34 33 further comprising a step

2   of, at the query provider, retrieving the results from the storage system.

1   36.   (currently amended) A method as in claim 34 33 further comprising

2   encrypting at least one of the key and the results.

Appl. No. 10/630,595
Preliminary Amdt. dated August 18, 2008

PATENT

1   37.   (previously presented) A method as in claim 33 wherein the query

2 provider provides query data comprising the SQL database queries to the database by storing the

3 query data in the storage system at a location and sending information about the location over the

4 first connection to the database system.

1   38.   (previously presented) A method as in claim 33 further comprising, at the

2 database system, the steps of:

3   retrieving the query data from the storage system; and

4   using the query data to obtain the results.

1   39.   (original) A method as in claim 33 further comprising providing a flag

2 associated with the results to indicate whether the results are ready to be read by the query

3 provider.

1   40.   (original) A method as in claim 37 further comprising providing a flag

2 associated with the results to indicate whether the results have been read by the query provider.

1   41.   (currently amended) A method for use in~~In~~ a data storage system

2 connected to an application system and a database system via a network, ~~a~~ the method

3 comprising:

4   receiving from the database system over the network, results of execution of SQL

5 database queries, the SQL database queries being sent to the database system by the application

6 system;

7   storing the results of execution of SQL database queries in a storage area that the

8 database system and the application system can access separately via separate connections to the

9 storage area, the separate connections comprising:

10   a first data path to provide a data connection between the storage system

11 and the application system, wherein the application system can directly access query results on

12 the storage system without communicating via the first connection; and

13   a second data path to provide a data connection between the storage

14   system and the database system, wherein the database system directly stores query results to the

15   storage system via the second data path without communicating via the first connection;

16   determining a return path for the results of the execution of queries to the

17   application system based upon one or more attributes of the results of the execution of queries;

18   and

19   sending, in response to a request from the application system, the results of

20   execution of queries to the application system over the network if the network is determined to

21   be the return path or returning an address in the shared volume for the results of the execution of

22   the query if the shared volume is determined to be the return path;

23   the method further comprising:

24   generating a key for the results to identify their location, wherein the key is used

25   to control access to the results, and also has associated therewith a flag to indicate status of the

26   file, and wherein the flag indicates at least one of whether the file is being written, is ready to be

27   read, is being read, and is available to be deleted;

28   sending the key over the network to the query provider; and

29   encrypting at least one of the key and the results.

1   42.   (currently amended) A method comprising: In a system having an

2   application system, a database system connected to the application system via a first network

3   connection, a return path selector coupled to the database system for selecting a return path over

4   which to return the results from queries made to the database system, and a data storage system

5   connected to the application system via a first data path and connected to the database system

6   through a second data path, the first data path providing a data connection between the data

7   storage system and the application system through which the application system can directly

8   access query results on the data storage system without communicating via the first connection,

9   and the second data path providing a data connection between the data storage system and the

10   database system through which the database system directly stores query results to the data

11	~~storage system via the second data path without communicating via the first connection, a~~
12	~~method, comprising the steps of:~~
13	sending an SQL database query, in a system having an application system, a
14	database system connected to the application system via a first network connection, a return path
15	selector coupled to the database system for selecting a return path over which to return the results
16	from queries made to the database system, and a data storage system connected to the application
17	system via a first data path and connected to the database system through a second data path, the
18	first data path providing a data connection between the data storage system and the application
19	system through which the application system can directly access query results on the data storage
20	system without communicating via the first connection, and the second data path providing a
21	data connection between the data storage system and the database system through which the
22	database system directly stores query results to the data storage system via the second data path
23	without communicating via the first connection, from the application system to the database
24	system by using the first network connection;
25	selecting a return path over which to return the results from SQL database queries
26	made to the database system from among at least the first network connection or the first data
27	path between the storage system and the application system, wherein the return path selector
28	determines the return path based upon one or more attributes of the query results;
29	storing a result of execution of the query in a shared volume of the data storage
30	system that can be accessed by the application system via the first data path and by the database
31	system via the second data path; and
32	obtaining at the application system, the result of execution of the query from the
33	storage system via the first data path without going through the first connection over the
34	network;
35	the method further comprising:
36	generating a key for the results to identify their location, wherein the key is used
37	to control access to the results, and also has associated therewith a flag to indicate status of the

Appl. No. 10/630,595
Preliminary Amdt. dated August 18, 2008

PATENT

38 | file, and wherein the flag indicates at least one of whether the file is being written, is ready to be

39 | read, is being read, and is available to be deleted;

40   sending the key over the network to the query provider; and

41   encrypting at least one of the key and the results.

1   43.   (original) The method of claim 42, wherein the first connection is a Local

2   Area Network, and wherein the second connection is a Storage Area Network.